

Review of Interdisciplinary and Policy Dimensions of the Earth Sciences (IPDES) Graduate Certificate Program (October 30 – 31, 2006).

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David R. Montgomery, UW
William Clark, external member, Harvard University

Summary findings and recommendations: We find that the IPDES program has emerged as an innovative experiment in fostering high quality interdisciplinary, use inspired basic research in the areas of earth systems science. The IPDES Program provides a model that has relevance beyond its use to frame the present program.

The essential elements of this experiment that make it innovative and worthy of continuance and expansion are:

- (1) co-supervisors who must agree on both the disciplinary and additive components of the program,
- (2) the IPDES seminar, and
- (3) a line of student support to assure that the involved departments see this as a win-win situation.

These three elements working together provide a mechanism to foster high quality, interdisciplinary work at a fundamentally discipline-centric campus by assuring that students will receive depth commensurate with disciplinary expertise and exposure to extra-disciplinary expertise and community. This is a model that has the following important attributes:

- It is consistent with UW culture.
- It has the potential for greater involvement with other units on the campus including the Program on Climate Change and the Evans School of Public Affairs.
- It enables the University of Washington to have a distinctive and effective model of interdisciplinary graduate education that would provide a contrasting, and complementary, experiment to the approach of creating interdisciplinary departments, schools, or colleges as has been undertaken at a number of leading institutions.
- It is also easily sustained once given sufficient visibility.

We recommend that the program be continued for a five-year period, and then be re-reviewed. During this period, we recommend that the program be expanded to reach critical mass, and that in so doing it implement a number of tactical adjustments detailed later in this report.

Review Procedure: We have evaluated the Interdisciplinary and Policy Dimensions of the Earth Sciences (IPDES) Graduate Certificate Program via several mechanisms. We have read all written material including that in the self-assessment. Professors Hinckley and Montgomery met with Associate Dean of the Graduate School and others regarding the nature and charges associated with the review, and held an initial discussion with Professor Ed Miles, Program Director. Hinckley solicited written feedback from the students historically and currently associated with the program. The committee met the following individuals over a two day period (October 30 and 31, 2006): Ed Miles, Program Director; David Secord, Director, Program on the Environment; Victor Yagi, IPDES staff support, two of the student's co-advisors, Marina Alberti and Joyce Cooper; Sandra Archibald, Dean, Evans School of Public Affairs, Arthur Nowell, Dean, College of Ocean and Fishery Sciences, members of the IPDES Advisory Committee (Mike Wallace, Robert Edmonds, Michael Brown, and David Armstrong) and the following students both in groups and individually (Meriwether Wilson, Scott Stolnack, Carrie Lee, Molly Mathias, Emilie Flemer, and Joseph Casola). In addition, we received written material from students Jeremy Bunn and Edie Sonne Hall, the only graduate to date of the Program.

Program History: The IDPES Program was approved in 2003. The first cohort of graduate students was admitted for Autumn Quarter 2004 (see Table 1). The third cohort of students has just started the program. To date, one student has graduated (and procured a job clearly acquired and related to the boost provided by IPDES) and one other student has left the program. The program was funded for an initial two year period, which was renewed for a third year, with six quarters of graduate student support provided each year (Table 1). Typically, two-quarters of supported have been or are provided to three students each year.

Table 1. Graduate student enrollment by degree and year in the IPDES Program

| Academic Year | 2004 - 2005 | 2005 - 2006 | 2006 - 2007 | 2007 - 2008 | 2008 - 2009 |
|----------------------|-------------|-------------|-------------|-------------|-------------|
| MS students admitted | 0 | 2 | 2 | | |
| MS graduated | 0 | 0 | 2* | | |
| PhD admitted | 3 | 2 | 0 | | |
| PhD graduated | 1 | 1** | 0 | | |
| Total admitted | 3 | 4 | 2 | | |
| Total graduated | 1 | | | | |

(*)Anticipated graduation December 2006.

(**) One Ph.D. candidate left the Program; student and two faculty co-supervisors felt that this was a positive outcome and the result of the student learning about what that student really wanted in a graduate program.

Three elements are critical to the Program: (1) co-supervision, (2) the disciplinary and certificate (or additive) requirements stated in the form of a contract, and (3) a capstone seminar. A syllabus from one of the capstone seminars and a sample Ph.D. student's program and contract are provided in Appendices 1 and 2, respectively.

Findings: We were asked to evaluate this program only two years after its initiation. Given the small number of students funded by the program, and the fact that few of those admitted would be expected to have yet graduated, such an early review runs the risk of premature conclusions and small-number bias. We have nonetheless tried to address as well as possible given the relative youth of the program, how this program is doing, the nature of its progress and whether it is on a productive trajectory.

We noted above in our summary findings and recommendations our general conclusion that the IPDES program has emerged as an innovative experiment in fostering high quality interdisciplinary, use inspired basic research in the areas of earth systems science. The IPDES Program provides a model that has relevance beyond its use to frame the present program.

In addition to this general finding, we found that the program has the following strengths:

1. The program has transcended the vision of its founder, and reached a state where it could be continued as an integral part of the UW graduate program under an appropriate successor.
2. The dual supervising system is working to assure (a) departmental control over the disciplinary foundation of this interdisciplinary program and (b) student, committee and disciplinary license to pursue the value-added component of the program.
3. The IPDES Seminar is working as an integrating device that generates a sense of community among IPDES students.
4. For the students involved in the program, there is a uniform and strong sense of community.
5. All students spoke highly of the value-added component of the Program.
6. From the faculty, we have found either support or very strong praise. Faculty mentioned the additional avenues or connections that the dual supervisory relationship opened up for them.
7. Several students mentioned that the availability of this program was what attracted them to the University.

We also found several weaknesses in the program:

1. Inadequate staff support, partially due to a high turnover in the position responsible for providing such support.
2. A poor ratio of applicants to admissions
3. Poor campus visibility.
4. Program does not appear to be keeping adequate track of student information including contracts and progress.
5. Program does not appear to have clear metrics for evaluation.
6. Program has no current mechanism for the cultivation of a core of committed faculty or to foster the emergence of a future leader.

Recommendations:

We noted above our overall recommendation that

- 1) **...the program be continued for a five-year period, and then be re-reviewed. During this period, we recommend that the program be expanded to reach critical mass, and that in so doing it implement a number of tactical adjustments detailed later in this report.**

We also make the following supporting recommendations:

- 2) **Critical mass:** The Program should ramp up to a critical mass with cohort enrollment of 6 to 10 students per year.
- 3) **Visibility:** The program should seek ways of raising the visibility of the program, the demand for and quality of the student applicant pool. Possible ways to accomplish this could be better advertising, better use and involvement of a restructured advisory committee, and better linkage with other relevant campus programs.
- 4) **Diversity:** As recommendations 2 and 3 are carried out, efforts to reach and encourage all elements of the University of Washington's graduate student community should be sought.
- 5) **Advisory committee:** The advisory committee should be built from the faculty who have participated or who are actively participating in the program. In addition, faculty in existing and potentially participating departments who are known for their interdisciplinary graduate training be asked to serve on the advisory committee. This advisory committee could then provide a potential pool of rotating leadership as well as a more proactive institutional exposure for this program.
- 6) **Linkages:** The Program needs to expand its linkage to other campus programs such as the Program on Climate Change and the Evans School of Public Policy.
- 7) **Recognition of faculty contributions:** The University needs to make sure that there are formal mechanisms for faculty recognition of their participation as co-supervisors in this program. This is especially important for junior faculty.
- 8) **Name:** The current name of the program does not adequately reflect what the program is doing. Specifically, we recommend the elimination of the word "policy" since, as the program has developed, there is no guarantee that all graduates achieve mastery of the policy sciences. (The review committee views this as a strength rather than a weakness. The program as it has emerged is primarily attractive as a mechanism to provide quality interdisciplinary training and experience to those who want it. A connection to policy studies is one, but only one, such interdisciplinary dimension). We also feel that the current title reduces the potential pool of applicants. A possible alternative title that more accurately reflects the current program might be Interdisciplinary Dimensions of Earth System Science (IDESS).
- 9) **Certificate:** Although certificate may not be currently or ultimately be the correct word to describe the additive component, it is a word that has enable the program to continue; therefore, as this experiment continues and unfolds, a 'certificate' represents perhaps the least problematic venue for this program. However some thought in the

future may be required regarding the nature of this innovative, asymmetric model of interdisciplinary graduate education and research.

- 10) **Funding strategy:** The University and Program Director need to develop a long-term strategy as how to support this program. This strategy should include better institutionalization of the program, wider embracing of the values of this program in other units, and foundational or donor support. (An effective model used by other universities has been one of initial support from the university, expanded through priority access within the university to competition for foundation support, and backed by a long-term goal of raising endowment funding). Whatever model is used, the University should take the direct development pressures off of the Director, and place them in the development office with a priority consistent with university's commitment to fostering quality interdisciplinary training.
- 11) **Learning:** The University has many interdisciplinary initiatives. Both the program under review here, and the other programs, would almost certainly benefit from a systematic (i.e., comparative/benchmarking) examination of these initiatives with the end goal of harvesting the creative, the innovative and the best practices from these endeavors. We understand such an examination is occurring, however, there is a sense that a broader, more systematic discussion involving participating faculty and students would have merit.

Appendix 1
IPDES CAPSTONE SEMINAR

**Winter 2005 Syllabus and Readings (IPDES Students and Professor Ed Miles -
Instructor)**

| | |
|-------------|---|
| WEEK I. | Ed Miles - General Discussion and review from 2004 Keystone |
| WEEK II. | Ed Miles - Schellnhuber et al. and ESSEX Commentary. |
| WEEK III. | Ed Miles - Issues of Nonlinearity, Thresholds, and Multiple Stresses. |
| WEEK IV. | Scott Stolnack - Cross Scale Issues and Applications |
| WEEK V. | Jeremy Bunn - Local Action and Cities. |
| WEEK VI. | Joe Casola- Public Perception with a Focus on Drought. |
| WEEK VII. | Meriwether Wilson - Scenarios. |
| WEEKS VIII. | Carrie Lee - Social Dimensions Across Scales |
| WEEKS IX, X | All - Refinement, Review and Individual Research Feedback |

Professor Ed Miles led (Weeks 1 – 3):

Background - Review from last year (2004 - 2005)

- Schellnhuber's 1999 NATURE paper on "Earth System Analysis and the Second Copernican Revolution"
- Kates et al. summary in SCIENCE Vol 292 of the NRC publication, OUR COMMON JOURNEY.
- Ludeke, Petschel-Held, and Schellnhuber entitled "Syndromes of Global Change: The First Panoramic View", published in GAIA, Jan. 2004. This then is the background.

FOCUS FOR 2005 - 2006:

Focus on the methodological issues concerning analysis of nonlinearities and thresholds and of multiple stresses. For the second and third weeks of our sessions, I want to deal with the need to focus on nonlinearities and thresholds and multiple stresses in global change analyses far more than we have done to date.

- Schellnhuber et al. in ENVIRONMENT magazine, Vol. 47, No. 6 (OCT. 2005)
- Rial, Jose A. et al. 2004. Nonlinearities, Feedbacks and Critical Thresholds within the Earth's Climate System. CLIMATIC CHANGE, 65:11-38.
- Breshears, David D. et al. 2005. Regional vegetation die-off in response to global-change-type drought. PNAS, 0505734102, 5pp.

- Maslin, Mark. 2004. Ecological Versus Climatic Thresholds. *SCIENCE*, VOL. 306 (24 December), 2197-2198.
- Muradian, Roldan. 2001. Ecological thresholds: a survey. *ECOLOGICAL ECONOMICS* 38, 7-24.
- Burkett, Virginia et al. 2005. Nonlinear dynamics in ecosystem response to climatic change. *ECOLOGICAL COMPLEXITY*: 2:357-394.

Scott Stolnack: MULTIPLE SCALES

- Peters, D. P. C., R. A. Pielke Sr., B. T. Bestelmeyer, C. D. Allen, S. Munson-McGee, and K. M. Havstad. 2004. Cross-scale interactions, nonlinearities, and forecasting catastrophic events. *Proceedings of the National Academy of Sciences* 101:15130-15135.
- Edwards, M. S. 2004. Estimating scale-dependency in disturbance impacts: El Ninos and giant kelp forests in the northeast Pacific. *Oecologia* 138:436-447.
- The third paper is recommended as background reading but not required: Levin, S. A. 2000. Multiple scales and the maintenance of biodiversity. *Ecosystems* 3:498-506.

Jeremy Bunn – LOCAL ACTION

- Dublin – Implementing the National Climate Change Strategy
- Portland – Progress Report on Local Action and Global Warming

Joe Casola - DROUGHT

- Glantz and Katz, 1977. When is a drought a drought? *Nature* 267: 192-193.
- Meze-Hausken, E. Contrasting climate variability and meteorological Drought and climate in northern Ethiopia. *Climate Research* 27: 19-31.
- Wilhite, 1994. State level Drought Planning in the United States. *Water International* 19. 15-24

Carrie Lee - ADAPTATION

- Walker, B., C.S. Holling, S. R. Carpenter, and A. Kinzig. 2004. Resilience management in social-ecological systems: a working hypothesis for a participatory approach. *Ecology and Society* 9(2):5
- Adger, W.N. 2003 Social Capital, Collective Action, Adaptation to Climate Change. *Economic Geography* 79(4): 387-404

- Adger, W.N. et al. 2005 Successful adaptation to climate change across scales. Global Environmental Change 15: 77-86

Meriwether Wilson - SCENARIOS

- Alcamo, J. 2001. Scenarios as Tools for International Assessment. European Environment Agency.
- 2005 Millenium Ecosystem Assessment Report, Chapter 5,.
- Raskin, P., Swart, R. J, and Robinson, J. 2004. Navigating the sustainability transition: The future of scenarios. In: Proceedings of the 2002 Berlin Conference on Human Dimensions of Global Environmental Change “Knowledge for the Sustainability Transition”. Global Governance Project, Amsterdam,
- Bennet, E.M., Carpenter, S.M., Peterson, G.D., Cumming, G.S., Zurek, M., and Pingali, P. 2003. Why global scenario’s need

Appendix 2
Two examples of Ph.D. Student Programs
Prepared for the POE – IPDES Review Team

STUDENT: Example Ph.D. Student A

(PhD in the Built Environment Candidate & IPDES Certificate Participant)

FOCUS OF RESEARCH

My PhD studies are “in the Built Environment” through the College of Architecture, Urban Planning, in connection with the College of Ocean and Fishery Sciences. I am focusing on how the fusion of urban design and marine ecosystem science can offer more robust solutions to both pressures from population growth and climate change challenges in the coastal-marine realm than either discipline alone. In particular, I am focusing on urban waterfront settings that are going through sufficient economic and demographic transition so as to provide opportunities for ecological enhancement of the urban marine edge. While I am interested in a range of waterfronts around the world, I am focusing on Seattle and Puget Sound as a case study of a changing city, within in a globally unique body of water.

VALUE ADDED OF IPDES CERTIFICATE

As evidenced through my above research statement and the subsequent program of study, the IPDES Certificate has facilitated the following additional values to my research:

- a formal mechanism within the University of Washington system to conduct interdisciplinary research across two colleges that traditionally have had minimal collaboration; and
- an intellectual conduit to pursue the convergent relationships of policy, science and practice between urban design and nearshore ecological processes;
- opportunities the keystone seminar and discussions with other IPDES participants, to examine the science and policy dynamics of nearshore implications of climate change that are relevant to my studies.

Without IPDES, finding a way to balance the needed breadth and focus of my research, would have more challenging.

PROGRAM OF STUDY (as of Fall 2006)

I have completed the following coursework during the past two years in close consultation with my dual-college PhD. Committee (see bottom of last page). The portfolio of this program of study listed below reflects my interdisciplinary focus on ways to integrate nearshore ecological processes into policies and practice related to urban design, the built environment and coastal planning.

The following portfolio of coursework taken to date concurrently fulfills the coursework requirements of the CAUP PhD in the Built Environment, the IPDES Certificate, and the Graduate School. The undertaking of this interdisciplinary program of study has also:

- a) guided the selection and composition of my PhD committee,
- b) shaped the direction of actions related to my general exams and achievement of candidacy status (e.g. the composition of an interdisciplinary reading list and subsequent written and oral exams); and
- c) informed the approach and methods of my dissertation research.

PhD Built Environment Requirements (first discipline)

B E 551 The Contemporary Built Environment (3) *Anderson*

Covers major or landmark cases of complex built environment projects, emphasizing the multiple dimensions involved and their interconnections.

B E 552 Theories of Knowledge and the Built Environment (3) *Mugerauer* Systematic examination of alternative epistemological frameworks applicable to studying the built environment; examinations of their differences and similarities and of the possibility of a comprehensive, pluralistic approach.

B E 553 Ethics in Practice, Research, and Teaching (3) *Blanco*

Preparation for ethical challenges facing professional practice, research, and teaching in the built environment. Coverage of general and professional ethics, and examination of principles and rules and application through case studies.

B E 550 Colloquium-Practicum on Research-Practice and Teaching-Learning (6, 1 per qtr) *Rojas*

A synthetic and interdisciplinary forum for the presentation and peer critique of faculty and student research and practice projects, and a venue for pedagogical issues and skills for effective teaching and learning.

URBDP 519 Qualitative Research Planning (3) *Mugerauer*

Qualitative research methods covering both the theoretical foundations and practical methodologies of traditional and innovative approaches, including cognitive mapping, open-ended interviews, ethnographic observation, hermeneutics, phenomenology, critical theory, communicative action, grass-roots empowerment, post-structuralism, and self organization. (*First of two research methods requirement for Built Environment Phd*).

OCEAN 452 Spatial information Technologies in Ecosystem Sciences (3) *NW Logsdon*

Introduction to the use of GPS, GIS, and Remote Sensing in the ecosystem sciences. Integrates these technologies in an applied research setting. (*Fulfills 2nd course of research methods requirement of Built Environment Phd*).

IPDES Requirements ("2nd discipline")

ENVIR 500 Graduate Seminar in Environmental Studies (1, taken 2x) *Miles*

Exploration of multidisciplinary themes in environmental studies.

OCEAN 442 Oceanography of the Puget Sound (3) NW Kiel

Explores the role of oceanography in regional issues. Field opportunities and active investigation of applied oceanographic problems.

OCEAN 452 Spatial information Technologies in Ecosystem Sciences (3) NW Logsdon

Introduction to the use of GPS, GIS, and Remote Sensing in the ecosystem sciences. Integrates these technologies in an applied research setting.

SMA 521 Governmental Responses to Global Climate Change (3) Miles □ Exploration of

major scientific, policy and legal issues pertaining to problems of global climate change including regime design, use of climate models, impact on hydrology water resources, and forests.

SMA 510 Topics in Marine Ecology (3) Klinger

Study of ecological principles as they apply to marine species, populations, and ecosystems, using current examples from the primary literature, including contemporary issues such as species declines, species additions, pollution, and global change.

SMA 550 Special Topics in Marine Studies (3) Leschine, Logsdon, Simenstad Examination of

various aspects of marine studies. *Puget Sound Nearshore: Understanding the Past and Assessing the Future – WRIA9 Focus*)

SMA 591 Marine Science in the Coastal Zone (3) Klinger

Presentation and analysis of the marine science of estuarine, coastal, and open ocean systems, including evaluation and interpretation of scientific information necessary for management. Lectures, discussions, and readings emphasize the relevance of natural processes to marine environmental management and decision-making.

FISH 513 Current Topics in Management, Conservation, and Restoration (2) Claire

Horner-Devine Contemporary problems and issues in management, conservation, and restoration as they relate to fisheries and aquatic sciences. (*Biodiversity, Millennium Assessment Focus*)

SMA/ESS 585 Climate Impacts On The Pacific Northwest (4) Mantua. Examine resource

management practices from a "climate perspective, and the surrounding context of regional resource management decisions needed to identify the causes of societal sensitivity and vulnerability to climate fluctuations. (*Registered to take in Winter 07*)

| |
|---|
| Additional Study for Graduate School Credit Requirements and dissertation topic relevance. |
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URBDP 498 Special Topics (3) Alberti

Systematic study of specialized subject matter. Topics for each quarter vary, depending upon current interest and needs (*Future Scenarios of Puget Sound and Ecosystem Resilience*)

URBDP 508 Specialized Planning Laboratory – Studio (5) Kasprisin

Studio/field project on a specialized planning problem. Several options are offered each year, such as regional-environmental planning, housing, metropolitan planning, and urban design. (*STUDIO – Seattle Waterfront, Shoreline Infrastructure Changes, Conducted with Allied Arts Partner.*)

L ARCH 504 Regional Landscape Planning Studio (4) Rottle

Application of landscape ecological theory to the design of urban environments. Focuses on the strategic design of urban infrastructure, including underground drainage systems, roads, parks, transit systems, and on understanding the cumulative performance of urban sites. (*STUDIO Seattle Open Space Strategies for 2100*)

L ARCH 600 Independent Study or Research Studio (4) Rottle (Detailed examination of new shoreline restoration considerations and physical models related removal of Seattle Pier 48 provide nearshore restoration, education, urban design innovation opportunities.)

L ARCH 600 Independent Study or Research Studio (4) Hill (Detailed examination of new shoreline configurations and social uses new Seattle waterfront and park seawall designs in light of transportation changes. Conducted in partnership with City of Seattle City Council.)

L ARCH 561 Regional Landscape Planning and Design Theory (2) Hill

Discussion of theories and case studies that provide a framework for defining sustainable urban design as both a cultural and biophysical phenomenon.

L ARCH 550 History and Theory of Modern Landscape Architecture (3) Streatfield

Lecture/seminar on history and theory of landscape architecture from the eighteenth century to the present. Relation to theory in related environmental design disciplines such as architecture and urban planning and other disciplines such as geography.

ENVIR 501 Graduate Seminar in Environmental Management (8, yr long) Addresses a contemporary interdisciplinary issue in environmental management by integrating the perspectives and theories of science/technology, public policy, and business. Format emphasizes interactive, hands-on approaches to problem solving, with visiting lectures by academic and/or external practitioners. (*POE Luce Fellowship, Leadership role on project focusing on seawall designs for City of Seattle, Waterfront Ecology Group*)

Contract:

Co-supervisor: Professor X, CAUP, Departments of Architecture and Urban Planning

Co-supervisor: Professor Y, COFS, School of Marine Affairs, Adjunct School of Law

Committee: Professor Z, COFS/School of Marine Affairs, Adjunct School of Aquatic & Fishery Sciences; Professor U, CAUP, Department of Landscape Architecture, Professor V, GSR, Department of Atmospheric Sciences.

Appendix 2 Continued
Two examples of Ph.D. Student Programs
Prepared for the POE – IPDES Review Team

STUDENT: Example Ph.D. Student B

(PhD in Atmospheric Sciences & IDPES Certificate Participant)

Statement of Purpose

My study of climate dynamics is motivated by a desire to inform and educate. The value of understanding the mechanisms that affect and control climate can only be realized if the knowledge is disseminated to and applied by society's policy and decision makers. **The Interdisciplinary and Policy Dimensions of Earth Science (IPDES) program offers me a unique opportunity to research the climate system while simultaneously exploring the ways society can best use climate information.**

Specifically, I am interested in how the climate system affects the availability and use of water in the western U.S. Some of the questions I hope to explore in my research include:

- What aspects of the general circulation influence precipitation on long time scales (decades to centuries)? How do these factors also affect the frequency and severity of droughts?
- Quantitatively, what defines a drought? What mechanisms act to reinforce or extend drought conditions? What are the mechanisms that terminate droughts?
- Which sectors of the economy are most vulnerable to drought conditions? What institutions or determine how governments or resource managers prepare and cope with drought? Which sectors' interests receive the highest priority during drought?
- How have communities in the West developed their water use patterns in the context of past precipitation variability? Is their water use sustainable with respect to extreme events or climate change? How do expectations for population growth compare to those of water availability?

The IPDES experience would be invaluable in laying the groundwork for a career as a scientist engaged in the policy-making process. There is a growing need for scientists to bolster their ability to communicate with policy makers, media professionals, and the general public. I believe that this can only be accomplished if today's graduate schools can produce a cadre of science translators and technical intermediaries that understand the language and research tools of both science and policy analysis. Participating in the IPDES program would provide the integrated training that would qualify me to serve as such a science translator.

Potential PhD Committee

- Co-Chair – Professor A, Department of Atmospheric Science
- Co-Chair – Professor B, School of Marine Affairs, Co-Director Center for Science in the Earth System
- A faculty member from the Atmospheric Science department, preferably one with experience in North American regional climate and/or integrated assessment
- A faculty member from the Civil and Environmental Engineering Department with a research

interest in the hydrology of the western U.S., especially as it relates to extreme events (drought and flood) and resource management design.

- A faculty member with expertise in environmental policy and decision making, possibly from the Evans School of Public Affairs

Tentative Program of Study

- Climate Dynamics (*ATM S 587, Completed Fall 2004*)
- Government Responses to Global Climate Change (*SMA 521, Completed Fall 2004*)
- Climate Impacts on the Pacific Northwest (*ATM S 585, Completed Winter 2005*)
- General Circulation (*ATM S 545, Offered Winter 2006*)
- Atmosphere-Ocean Interactions (*ATM S 575, Offered Winter 2006*)
- Physical Hydrology (*CEE 476*)
- Environmental Policy Processes (*ENVIR 500A*)
- Role of Scientific Information in Environmental Decision Making (*ENVIR 500B*)

Appendix 3
Example of M.S. Student Program
Prepared for the POE – IPDES Review Team

STUDENT: Example MS Student A

(MS in Forest Resources (Ecosystem Analysis) & IDPES Certificate Participant)

IPDES completion plan

Requirements:

- 20 credits in policy or a related interdisciplinary cognate field; with 9 of these credits in courses 500 or above
- Interdisciplinary thesis

Coursework plan:

SP 06

URBDP 422 – Urban and Regional Geospatial Analysis - 5 cr.

- Total IPDES credits completed up to this point: 5

AU 06

URBDP 450 – Land Use, Growth Management, and Environmental Planning – 3 cr.

ENVIR 500 – Seminar in Environmental Studies: The Role of Science in Environmental Decision Making – 3 cr.

- Total IPDES credits completed up to this point: 11
- Total IPDES credits in coursework 500 or above to this point: 3

WI 07

****Required** - IPDES Capstone Seminar – 1 cr.

URBDP 598 – Comprehensive planning and Implementation – 3 cr.

URBDP 498 – Intro to Environmental Planning – 3 cr.

or

SMA 585 – Global Climate Change in the Pacific Northwest – 4 cr.

- Total IPDES credits completed up to this point: 18-19
- Total IPDES credits in coursework 500 or above to this point: 6-10

SP 07

PB AF 590/ CFR 592 Environmental Policy Processes – 3 cr.

UBBDP Land use? (not sure yet whether it will be offered) – 3 cr.

- Total IPDES credits completed up to this point: 21-22
- Total IPDES credits in coursework 500 or above to this point: 9-13

Thesis topic: Conservation corridor mapping in King County, WA: integrating landscape ecology and conservation planning.

Co-Advisor's signatures to approve this plan of study:

Signature: _____ **Date:** _____

Professor D – College of Forest Resources

Signature: _____ **Date:** _____

Professor C – College of Architecture and Urban Planning